ELECTRONIC CALIBRATION INC.
7000 Franklin Blvd., #725
Sacramento, CA 95823

MICRONTA®

LCD Digital Multimeter

OWNER'S MANUAL

Catalog Number 22-197U

CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION

RADIO SHACK LIMITED WARRANTY

This equipment is warranteed against defects for 90 days from date of purchase. Within this period, we will repair it without charge for parts and labor. Simply bring your sales slip as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover equipment subjected to misuse or accidental damage.

This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

We Service What We Sell

RADIO SHACK, A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

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MAINTENANCE

Your Digital Multitester is a precision electronic device. Do not touch any of the circuitry inside the Case. Do not expose to extreme temperatures [below -4°F (-20°C) or above 140°F (60°C)]; protect from extremely humid areas.

To avoid damage:

- Never connect more than 1000 Volts DC or 500 Volts RMS AC.
- Never connect a source of voltage when Function Switch is in KOHM position.
- Never operate the DVM unless the Battery Cover is in place and fully closed (or AC Adapter is fully plugged in).
- Battery and/or Fuse replacement should only be done after the test leads have been disconnected and POWER is OFF.

The Micronta DVM comes to you fully calibrated and tested. Under normal use, no further adjustment should be necessary. If your Meter should require repair, do NOT try to adjust by yourself; bring it to your nearest Radio Shack store. SERVICE OF THE DVM BY UNAUTHORIZED PERSONNEL WILL VOID THE WARRANTY.

A WORD ABOUT SAFETY

Every precaution has been taken in the design of your meter to insure that it is as safe as we can make it. However, safe operation depends on you, the operator. We recommend that you follow these simple safety rules:

1. Never apply voltages to the DVM which exceed the limits given in the Specifications section. Never apply more than 1000 Volts DC or 500 Volts AC RMS between input jacks and/or ground.
2. Use extreme caution when working with voltages above 100V. Always disconnect power from the circuit being measured before connecting test leads to high-voltage points.
3. Always discharge filter capacitors before attaching test leads to a power supply.
4. Get into the habit of keeping one hand in your pocket when trouble-shooting any equipment containing high voltages.
5. Since many AC-DC sets have a potentially 'hot' chassis, be sure that the top of your workbench and the floor underneath it are dry and are made of non-conductive material.

SPECIFICATIONS

Display:	3-1/2-Digit, LCD
Accuracy	
DC VOLTS 2–20–200–1000V (Maximum measurement = 1000 Volts)	± 1% of reading and ±0.2% of full scale, ±1 in last digit
AC VOLTS 200–500V (Maximum measurement = 500 Volts RMS)	± 2% of full scale, ±1 in last digit
DC-CURRENT 2–20–200mA	±1.5% of reading and ±0.2% of full scale, ±1 in last digit
RESISTANCE 2–20–200–2000KOHM	±1.5% of reading and ±0.2% of full scale, ±1 in last digit
Operating Temperature:	0°C to 50°C
Storage Temperature:	-20°C to 60°C
Input Impedance:	DC 10MΩ, AC 1KΩ/V
Polarity:	Automatic Polarity
Over Range Indication:	1□□□
Power Source:	9 Volt rectangular battery or AC Adapter (Radio Shack Catalog Number 22-180)
Low Battery Indication:	"BT" on left side of display
Zero Adjust:	Automatic
Weight:	220g
Size:	1-1/2" X 3-11/32" X 5-1/8" (37mm X 85mm X 130mm)

Preparing for Operation

All you need to do is load a 9-volt battery. We recommend that you use the Alkaline type — such as Radio Shack's 23-553.
Be sure **POWER** is OFF and test leads are disconnected.
Open the battery/fuse compartment cover on the rear by pressing in the direction of the arrow. Snap the connector over the terminals of a 9-volt battery. Load the battery into the case and press the battery/fuse compartment cover back on.

When battery becomes weak, "BT" will be displayed on the left side. Replace battery. NEVER LEAVE A WEAK OR DEAD BATTERY IN YOUR UNIT. Even "leak-proof" types can leak and cause damage to the circuitry. When you are not going to use your unit for a few weeks, remove battery.

Or, you can operate from AC power.
WARNING: Use only Radio Shack's 22-180 AC adapter, which can withstand the 500 volts, which can appear at the connector.

Zero Adjustment
Is not required. It is automatically done internally in the circuit.

Use only the same type of test leads as are supplied with your unit. These test leads are rated for 1200 volts. Replacements are available from your local Radio Shack store.

Check Before Operation

1. Plug the red test lead into the DCmA/OHM jack, and the black test lead into the COM jack.
2. Set POWER ON.
3. Set Function Switch to KOHM.
4. With no resistance connected across the test leads, the over-range indication should occur, and display will show "1 ". Short the test leads; the display now should be three zeros.
5. Touch the red probe tip to the black probe tip, and set the Range Switch to the top range (2000 kΩ) and then to lower ranges. The decimal point in the display should be positioned as follows:

2000 KOHM	000
200 KOHM	00.0
20 KOHM	0.00
2 KOHM	.000

MAKING MEASUREMENTS

DC/AC Voltage Measurements

IMPORTANT: The maximum input limit for voltage measurements is 1,000V/DC and 500V/AC(RMS). If you attempt to measure DC voltages above 1000 volts or AC voltages above 500 volts RMS, your unit may be damaged.

1. Set Function Switch to DCV or ACV. Plug the red test lead into DCV or ACV jack, and the black test lead into the COM jack.
2. Set Range Switch as required for the voltage level to be measured. If you don't know the voltage level, start out with the Range Switch set to the highest position and reduce the setting as required to obtain a satisfactory reading.
3. Connect the probes to the circuit to be tested. In DCV, minus sign will appear if voltage is negative (with respect to black lead).
4. If the voltage exceeds the maximum on the range selected, the display will indicate an over-range "1 ". Select a higher range.

Resistance Measurements

The resistance measuring circuit applies a known value of constant current through the unknown resistance and then measures the voltage developed across it. Thus, when checking "in-circuit" resistance, be sure the circuit under test has all power removed (are all capacitors fully discharged?).

1. Set the Function Switch to the KOHM position. Plug the red test lead into the DCmA/OHM jack, and the black test lead into the COM jack.
2. Set the Range Switch to the desired position.
3. Connect the probes across the circuit to be measured.
4. If the resistance value being measured exceeds the maximum value of the range selected, an over-range indication will be displayed ("1 "). Select a higher range.

NOTE:
Some devices may be damaged by the current applied during resistance measurements. The following table lists the voltage and current available on each range.

RANGE	A	B	C
2K	1.27	0.51	0.51
20K	1.27	0.80	0.11
200K	1.27	0.84	0.0125
2000K	1.27	0.85	0.00127

A is open circuit voltage at the jacks in volts.
B is voltage in volts across a resistance equal to full scale value.
C is current in milliamps thru a short circuit at the input jacks.
All values are typical.

Your Micronta Digital Multimeter has internal protection for the KOHM ranges. For over-voltages less than AC140 Volts, an internal zener diode and resistors will protect the unit from damage.

DIODE CHECK

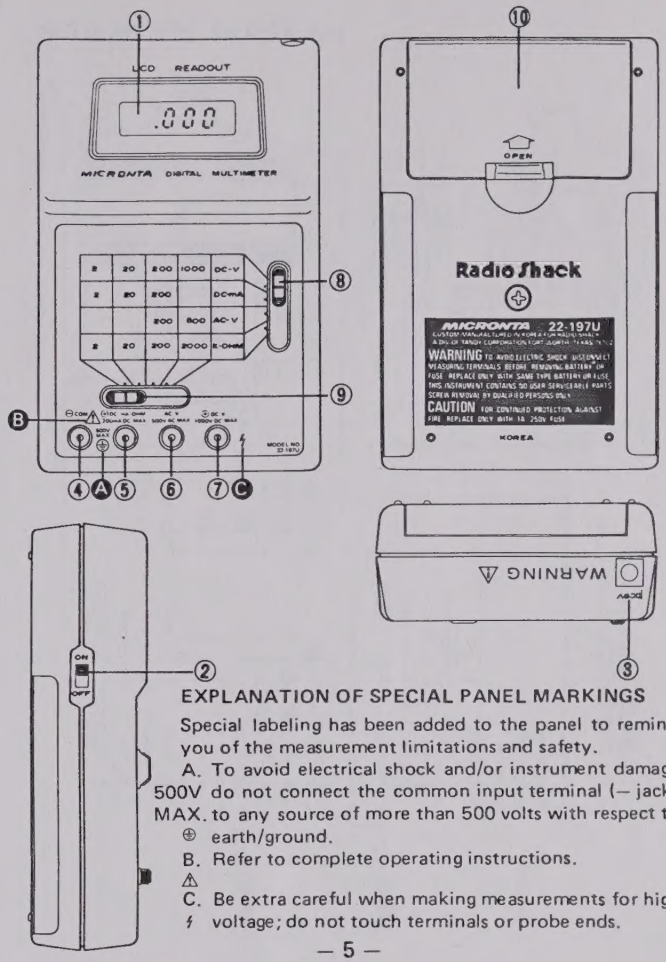
Since open-circuit voltage between plus and minus input jacks is maintained at 1.27 volts (when in resistance function), you can check continuity of most diodes, transistors, etc. Select the 20 KOHM or 200 KOHM range and connect meter probes to semiconductor leads. If over range occurs, reverse lead polarity. If over range still occurs, the semiconductor junction is defective (open).

DC Current Measurements

(Do not Attempt to Measure AC Current)

To measure current, you must break the circuit and connect the leads to two circuit connection points. **Never connect the leads across a voltage source;** doing so will blow the fuse or, even worse, may damage the circuit under test.

1. Place the Function Switch in the DCmA position. Plug the red test lead into the DCmA/OHM jack, and the black test lead into the COM jack.
2. Set the Range Switch to the desired position. Always set the Range Switch to the highest position if you don't know the amount of current to be measured.



EXPLANATION OF SPECIAL PANEL MARKINGS

Special labeling has been added to the panel to remind you of the measurement limitations and safety.

A. To avoid electrical shock and/or instrument damage 500V MAX. do not connect the common input terminal (— jack) ⊕ to any source of more than 500 volts with respect to earth/ground.

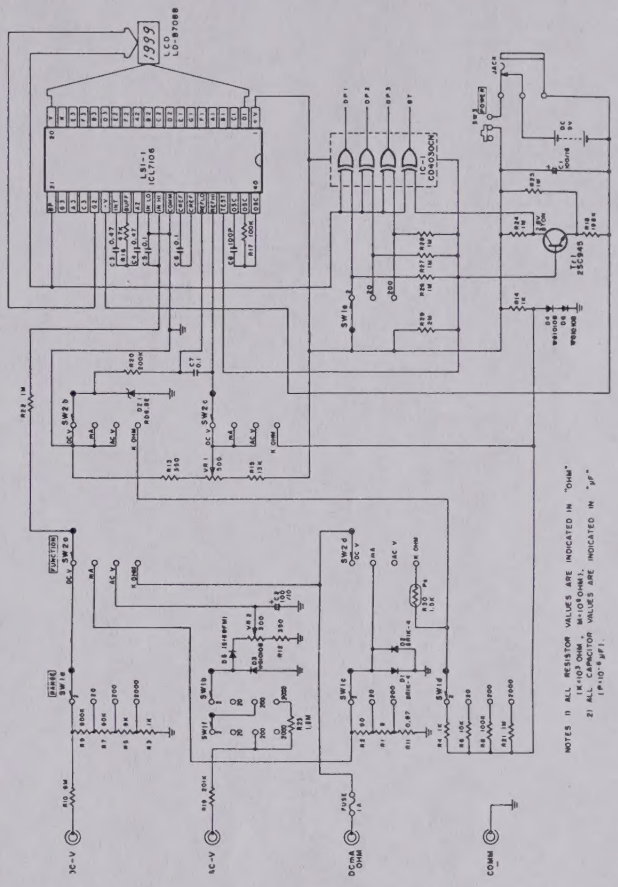
B. Refer to complete operating instructions. ⚠

C. Be extra careful when making measurements for high voltage; do not touch terminals or probe ends. ϟ

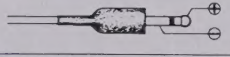
The MICRONTA LCD Digital Multimeter is a portable 3½-digit, compact sized Multimeter ideally suited for field, lab, shop, bench and home applications. Here's a review of some of the features that qualify your new Digital Multimeter as a real "pro."

- The latest IC and display technology is used to achieve the lowest possible component count. This, in turn, ensures reliability, accuracy, stability and a really rugged, easy-to-handle instrument.
- Low battery voltage automatically detected and displayed.
- No needles to bend. No parallax and no zero adjust. Just a high contrast, easy-to-read, 3½-digit, liquid crystal display.
- Effective overload and transient protection on all ranges.
- Over-range indication on each range.
- Full auto-polarity operation.
- Dual-slope integration to ensure fast, accurate, noise-free measurements.

SCHEMATIC DIAGRAM



CONTROLS AND FUNCTIONS

ITEM No.	NAME	FUNCTION
1	Display	A 3 1/2-digit display (1999 max.) with decimal point and minus polarity indication. Indicates measured input values plus over-range and low battery condition.
2	POWER switch	Turns the instrument ON and OFF.
3	AC adapter jack (DC 9V)	Use only the correct UL-listed AC adapter (Radio Shack Catalog No. 22-180). This is because up to 500V can appear at the connector. Our adapter is designed to withstand such voltage level (or more). 
4	Input COM jack	Connect black lead for all measurements.
5	Input DCmA/ OHM jack	Connect red lead for DC Current and resistance measurements.
6	Input ACV jack	Connect red lead for AC Voltage measurements.
7	Input DCV jack	Connect red lead for DC Voltage measurements.
8	Function switch	For selecting functions: DC Volts, DCmA, AC Volts, Kohms
9	Range switch	For selecting ranges: DC Voltage: 2V, 20V, 200V, 1000V DC Current: 2mA, 20mA, 200mA AC Voltage: 200V, 500V Resistance: 2K, 20K, 200K, 2000K
10	Battery/ Fuse Compartment	

3. Remove power from the circuit under test and then break the circuit at the appropriate point.
4. Connect probes to the circuit.
5. Apply power and read current.
6. If the polarity of the current being measured is negative, the value displayed will be preceded by a minus (–) sign.
7. If the magnitude of the current being measured exceeds the selected Range, the over-range circuitry will operate, displaying "1 ". When this occurs, immediately remove power from the circuit under test and select a higher current range.

NOTE:
The current ranges are fuse-protected. If inoperative check the fuse.

Replacement of Battery/Fuse

WARNING TO AVOID ELECTRIC SHOCK, DISCONNECT MEASURING TERMINALS BEFORE REMOVING BATTERY OR FUSE. REPLACE ONLY WITH SAME TYPE BATTERY OR FUSE. THIS INSTRUMENT CONTAINS NO USER SERVICEABLE PARTS. SCREW REMOVAL BY QUALIFIED PERSONS ONLY.
CAUTION FOR CONTINUED PROTECTION AGAINST FIRE, REPLACE ONLY WITH 1A, 250V FUSE.

1. Be sure POWER is OFF and test leads are disconnected.
2. Open the Battery/Fuse Compartment Cover.
3. Pull the red ribbon in the fuse compartment. The fuse will pop out.
4. Insert a new fuse on the ribbon ring. Use only a fuse of the same type/rating (1A, 250V, 5ϕ x 20 mm Miniature fuse).
5. Install fuse with ribbon in the fuse compartment.
6. Close the Battery/Fuse Compartment Cover

WARNING: DO NOT OPERATE YOUR UNIT UNTIL THE BATTERY/FUSE COVER IS IN PLACE AND FULLY CLOSED.